



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/816,385      | 04/01/2004  | Feng-Wen Sun         | PD-203051           | 9374             |

7590 02/22/2008  
The DIRECTV Group, Inc.  
RE/R11/A109  
P.O. Box 956  
El Segundo, CA 90245-0956

|          |
|----------|
| EXAMINER |
|----------|

HAILU, KIBROM T

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2616

|           |               |
|-----------|---------------|
| MAIL DATE | DELIVERY MODE |
|-----------|---------------|

02/22/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/816,385

Applicant(s)

SUN ET AL.

Examiner

Kibrom T. Hailu

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) 22-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-15 and 18-21 is/are rejected.
- 7) ☒ Claim(s) 5-6 and 16-17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-21, drawn to frame synchronization by duplicating, modifying and multiplexing the frame, classified in class 370, subclass .
  - II. Claims 22-26, drawn to encoding frame information, classified in class 370, subclass .
  - III. Claims 27-35, drawn to detecting start of a frame, classified in class 370, subclass.
  - IV. Claims 36-39, drawn to recovering framing information of a frame by descrambling and decoding, classified in class 370, subclass.
  - V. Claims 40-47, drawn to determining and designing peak location by setting a search window to declare acquisition of a frame, classified in class 370, subclass.
  - VI. Claims 48-49, drawn to output and generate LDPC coded frame to assist with frame synchronization, classified in class 370, subclass.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I, II, III, IV, V and VI related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combination (MPEP § 806.05(c)).
3. In the instant case, the combination I as claimed does not require the particulars of the subcombination II, III, IV, V and VI as claimed because the steps involved in group I relate to

frame synchronization by duplicating, modifying and multiplexing the frame and is not dependent upon II, III, IV, V and VI. The subcombinations have separate utility such as II for encoding frames, III for declaring a frame, IV for reconstructing or recovering frame(s), V for detecting and verifying location of a peak candidate, and VI for generating LDPC coded frame.

The combination II as claimed does not require the particulars of the subcombinations I, III, IV, V and VI as claimed because the steps involved in group II relates to encoding frame information and is not dependent upon I, III, IV, V and VI. The subcombinations have separate utility such as I for modifying a frame to support synchronization, III for declaring a frame, IV for reconstructing or recovering frame(s), V for detecting and verifying location of a peak candidate, and VI for generating LDPC coded frame.

The combination III as claimed does not require the particulars of the subcombinations I, II, IV, V and VI as claimed because the steps involved in III relates to detecting start of a frame and is not dependent upon I, II, IV, V and VI. The subcombinations have separate utility such as I for modifying a frame to support synchronization, II for encoding frames, IV for reconstructing or recovering frame(s), V for detecting and verifying location of a peak candidate, and VI for generating LDPC coded frame.

The combination IV as claimed does not require the particulars of the subcombinations I, II, III, V and VI as claimed because the steps involved in IV relates recovering framing information of a frame by descrambling and decoding and is not dependent upon I, II, III, V and VI. The subcombinations have separate utility such as I for modifying a frame to support synchronization, II for encoding frames, III for declaring a frame, V for detecting and verifying location of a peak candidate, and VI for generating LDPC coded frame.

The combination V as claimed does not require the particulars of the subcombinations I, II, III, IV and VI as claimed because the steps involved in V relates to determining and designing peak location by setting a search window to declare acquisition of a frame and is not dependent upon I, II, III, IV and VI. The subcombinations have separate utility such as I for modifying a frame to support synchronization, II for encoding frames, III for declaring a frame, IV for reconstructing or recovering frame(s), and VI for generating LDPC coded frame.

The combination VI as claimed does not require the particulars of the subcombinations I, II, III, IV and V as claimed because the steps involved in VI relates to output and generate LDPC coded frame to assist with frame synchronization and is not dependent upon I, II, III, IV and V. The subcombinations have separate utility such as I for modifying a frame to support synchronization, II for encoding frames, III for declaring a frame, IV for reconstructing or recovering frame(s), and V for detecting and verifying location of a peak candidate.

4. The examiner has required restriction between subcombinations usable together. Where applicant elects a subcombination and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

5. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination as indicated is proper.

6. During a telephone conversation with Mr. Anthony J. Orlor on 01/30/2008 a provisional election was made without traverse to prosecute the invention of group I, claims 1-21.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 22-49 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### *Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1, 4, 9, 11-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides et al. (US 6,665,361 B1) in view of Raleigh et al. (US 6,158,041).

**Regarding claims 1 and 4**, Christodoulides discloses a method for supporting frame synchronization in a digital communication system (col. 4, lines 16-19), the method comprising the steps of: mapping a codeword specifying framing information of a frame according to a signal constellation to output a data stream (Fig. 5; col. 5, lines 43-48, 56-58); duplicating and demultiplexing the data stream into a first data stream and a second data stream (col. 5, line 66-col. 6, line 6); and outputting a physical layer signaling header corresponding to the frame based on the multiplexed data streams (col. 1, lines 61-67; col. 4, lines 1-6; col. 5, lines 51-52; col. 5, line 66-col. 6, line 10).

Christodoulides doesn't disclose modifying the first data stream according to a predetermined operation; multiplexing the modified first data stream with the second data stream; and outputting a physical layer signaling header corresponding to the frame based on the multiplexed data streams.

Raleigh teaches modifying the first data stream according to a predetermined operation (Fig. 2; col. 4, lines 61-64, illustrates the first data stream is modified by multiplying the value  $i$  by the multiplier 222); multiplexing the modified first data stream with the second data stream (Fig. 2; col. 4, line 65-col. 5, line 1; explains the first data stream modified by multiplier 222 and the second data stream are combined or multiplexed by the summer 224 and the combined output is interleaved by interleaver).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use modifying first data stream by multiplying a constant value and

combine the modified first data stream with the second data stream outputted from the constellation map element as taught by Raleigh into the satellite communication of Christodoulides so that the decoder would not be overwhelmed with success errors, thus optimizing and avoiding degrading performance of the system.

**Regarding claim 9**, Christodoulides discloses scrambling the multiplexed data streams (col. 4, lines 3-6).

**Regarding claims 11, 12 and 15**, the same rejections to claims 1 and 4 are applicable hereto. The claims are just mere reformulation of claim 1 and 4 in order to define the corresponding computer-readable medium and apparatus.

10. Claims 2, 10, 13 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Raleigh, as applied to claims 1 and 12 above, further in view of Paulter et al. (US 6,859,503 B2).

The satellite communication of Christodoulides discloses the signal constellation depends on or according to 16QAM modulation scheme. However, Christodoulides doesn't disclose the signal constellation is independent of a modulation scheme of the frame (col. 4, lines 12-19; col. 5, lines 17-21, 46-48; col. 9, lines 48-55).

Paulter teaches the signal constellation is independent of a modulation scheme of the frame (col. 13, lines 63-67, explains the constellation can be any of the modulation schemes BPSK, QPSK, M-PSK, and M-QUAM).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate to incorporate any of the above specified modulation scheme (i.e. the signal constellation independent of the modulation schemes) as taught by Paulter into the



modified satellite communication of Christodoulides in order to transmit and receive data streams in different rates, thus efficiently control the transmission.

11. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Raleigh, as applied to claims 1 and 12 above, further in view of Mpgre et al. (US 2004/0047433 A1).

Christodoulides discloses a frame format for satellite communication (abstract).

Christodoulides doesn't disclose the frame is a Low Density Parity Check (LDPC) coded frame.

Mogre teaches the frame is a Low Density Parity Check (LDPC) coded frame (paragraph [0018]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use LDPC frame format of Mogre in the modified satellite communication of Christodoulides to efficiently transmit broadband service content using the LDPC that may operate efficiently and effectively using preexisting bandwidth allocated, and avoid attenuation problems when broadcast at preexisting transmission power level.

12. Claims 7 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Raleigh, as applied to claims 1 and 12 above, further in view of Kim et al. (US 6,851,085 B2).

Christodoulides discloses generating the codeword or unique word according to turbo or convolutional code. However, Christodoulides doesn't disclose generating the codeword according to a first order Reed-Muller code.

Kim teaches generating the codeword according to a first order Reed-Muller code (col. 2, lines 24-36).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the first order Reed-Muller code to generate codeword as taught by Kim in the satellite communication of Christodoulides so that a smaller and simplified hardware would be used to generate the codeword at different coding rates, that is, for the input of different information bits reduces the number of required encoders, simplifies the encoder and decoder structure, and as a consequence, decreases their size.

13. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Raleigh, as applied to claims 1 and 12 above, further in view of Love et al. (US 7,158,482 B2).

The modified satellite communication of Christodoulides discloses the framing information. However, the modified satellite communication of Christodoulides doesn't explicitly the framing information specifies a modulation scheme, and a coding scheme.

Love teaches the framing information specifies a modulation scheme, and a coding scheme (Fig. 4; col. 5, lines 55-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate framing information or field indicating modulation and coding schemes as taught by Love into the modified satellite communication of Christodoulides in order to improve data throughput of the system, and properly demodulate and decode the data streams.

*Allowable Subject Matter*

14. Claims 5, 6, 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


*Conclusion*

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kibrom T. Hailu whose telephone number is (571)270-1209. The examiner can normally be reached on Monday-Thursday 8:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Q. Ngo can be reached on (571)272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KTH  
02/19/08

  
RICKY Q. NGO  
SUPERVISORY PATENT EXAMINER